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MYRMECOCYSTUS MELLIGER COMPLEX
(Hymenoptera: Formicidae)

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TAXONOMIC NOTES ON THE *MYRMECOCYSTUS MELLIGER* COMPLEX

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ABSTRACT: The *Myrmecocystus melliger* complex is defined and the taxonomic status of the specific and varietal names included is investigated. A key to the component species, for workers and females, is given and these castes are illustrated. Species included are: *M. mendax*, *M. melliger* (synonym: *M. melliger mendax comatus*), *M. semirufus* and *M. placodops* (synonym: *M. melliger orbiceps*); *M. melliger testacea* is removed from the synonymy of *M. semirufus* and transferred to the *mexicanus* group as a senior synonym of *M. mojave* (new synonym).

When Wheeler (1908) revised the genus *Myrmecocystus*, he recognized but two protean species, *M. melliger* Forel and *M. mexicanus* Wesm. Each of these had attributed to it a number of subspecies and varieties. Additions by Wheeler and others in subsequent years added three specific names and a welter of additional subspecies and varieties, most of these assigned to *M. melliger*.

Probably the number of names proposed would not be so high had not Wheeler propounded a peculiar theory with respect to these ants. He postulated that certain forms were behaviorally incapable of forming repletes. The result was that whenever he found a colony of a presumably nonreplete forming species which contained repletes, he was faced with a dilemma; whether to abandon his original idea or to describe the occupants of the colony as a new form. Unfortunately, he chose the latter course of action, resulting in a number of superfluous names founded on extremely dubious characters.

Creighton (1950) reevaluated many of these names and rightly placed them in synonymy. The present paper is a further evaluation of one complex in the genus, the *M. melliger* complex, and is published at this time in order that the changes proposed here may be available to others conducting investigations in this genus.

As constituted by Creighton (1950), the *M. melliger* complex includes those species with the following combination of characteristics in the worker caste: mandibles with seven teeth; eyes small, their greatest diameter equal to the length of the first funicular segment; ocelli always present, prominent; petiolar node thick from front to back, the crest blunt; erect hairs coarse and numerous, abundant and conspicuous on cheeks, those on gaster arising from punctures at the top of small conical papillae; pubescence dense, especially on gaster, largely obscuring surface beneath; integument dull to moderately shining; larger species, 4.5-11.0 mm.

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The component names assigned to this complex by Creighton were arranged as follows:

M. comatus Wheeler, 1908

M. melliger melliger Forel, 1886

M. melliger californicus Cole, 1936

M. melliger orbiceps Wheeler, 1908

M. mendax Wheeler, 1908

The subspecies *M. m. californicus* was known only from the type material, which Creighton had not seen, and was only tentatively placed with *M. melliger*. As I have shown elsewhere (Snelling, The identity of *Myrmecocystus melliger mimicus* var. *californicus* Cole, unpublished), this species must be transferred to the genus *Formica*. Creighton predicted that *M. m. orbiceps* would prove to be a synonym of the nominate form and in 1954 Creighton and Crandall were able to verify this. The only recent change was by Gregg (1963), who proposed returning *M. mendax* to the status originally given it by Wheeler, a subspecies of *M. melliger*.

My own investigation of this genus, based on type material of all forms, has convinced me that drastic changes are necessary within this complex and I propose to arrange the species as follows:

M. mendax Wheeler, 1908

M. melliger Forel, 1886

M. semirufus Emery, 1893

M. placodops Forel, 1908

Each of these component species is discussed in detail below.

***Myrmecocystus mendax* Wheeler**

Myrmecocystus melliger var. *semirufus* Emery, 1893. Zoologische Jahrbuch, Abt. für Systematik, 7:667 (in part).

Myrmecocystus melliger subsp. *mendax* Wheeler, 1908. Bull. Amer. Mus. Nat. Hist., 24:351, fig. 4, ♀ ♀ ♂; Wheeler, 1912, Psyche, 19:173; Gregg, 1963, Univ. Colo. Press, pp. 645-648.

Myrmecocystus mendax Creighton, 1950. Bull. Mus. Comp. Zool., 104: 442, 445.

This species, originally described from Colorado, ranges westward as far as California, through New Mexico and Arizona. It is closely related to *M. semirufus* and even more closely to *M. melliger*. I believe, however, all are distinct species, even though the differences which separate them are slight. When Emery described *M. melliger* var. *semirufus*, he had before him a mixed series of specimens from San Jacinto, California, and from Denver and Pueblo, Colorado; each series represents a different species. The Denver specimens are *M. mendax*, the Pueblo specimens are *M. melliger* and the series from San Jacinto (which includes the type) are *M. semirufus*. From the related species, *M. mendax* may be separated by the characters given in the key below.

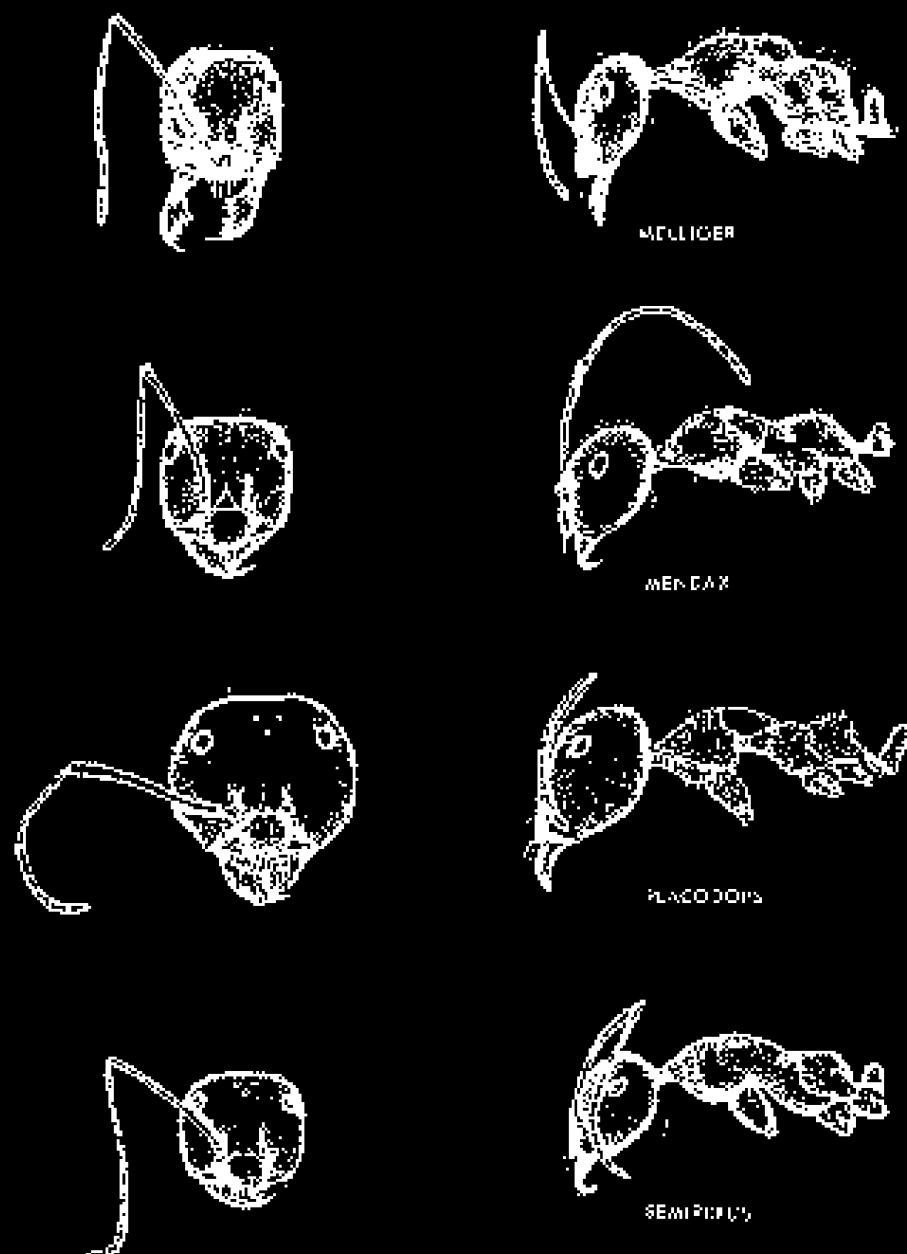


Figure 1. *Myrmecocystus* spp., major workers; left, frontal view of head; right, lateral view of head and alitrunk: *M. melliger*, holotype from Mexico; *M. mendax*, holotype from Mt. Washington, Colorado; *M. placidus*, type from Mexico; *M. semiparus*, holotype from San Jacinto, Calif.

***Myrmecocystus melliger* Forel**

Myrmecocystus melliger Forel, 1886. Annales Société Entomologique de Belgique, 30:202. ♀.

Myrmecocystus melliger var. *semirufus* Emery, 1893. Zoologische Jahrbuch, Abt. für Systematik, 7:667 (in part).

Myrmecocystus melliger subsp. *mendax* var. *comatus* Wheeler, 1908. Bull. Amer. Mus. Nat. Hist., 24:352, fig. 5, ♀ ♂. Wheeler, 1912, Psyche, 19:173. NEW SYNONYM.

Myrmecocystus comatus, Creighton, 1950. Bull. Mus. Comp. Zool., 104:442; Gregg, 1963, Univ. Colo. Press, p. 643.

The types of *M. melliger* and *M. comatus* have been available to me and have been compared with one another, and found to be the same. It is unfortunate that *M. comatus* is the same as *M. melliger* since this necessitates applying a completely revised concept to an old name. How Wheeler made the error he did is not difficult to understand, even though Forel had sent him specimens from the original series of *M. melliger*. As pointed out above, Wheeler was convinced that some species do not form repletes. During his extensive field work in this genus, he never found repletes in the nests of the ant which he described as *M. melliger comatus*. Obviously, in his concept, this could not be the same as Forel's *M. melliger*, since that was known to produce repletes. On the other hand, another very similar ant commonly had repletes present in the nest, and Wheeler was bound to equate this with *M. melliger*. In so doing, he ignored the specimens of true *M. melliger* and relied instead on behavioral data interpreted in accordance with an incorrect postulate. Further, his own field data were inadequate, as I took a colony of *M. comatus* (i.e., *M. melliger*) in the Jeff Davis Mountains, the type locality of *M. comatus*, which contained several fully developed repletes.

***Myrmecocystus semirufus* Emery**

Myrmecocystus melliger var. *semirufus* Emery, 1893. Zoologische Jahrbuch, Abt. für Systematik, 7:667 (in part).

Although Wheeler had a cotype of this species available to him, he misidentified the ant and applied this name to a different taxon. The correct identity of *M. semirufus* has never been recognized until now. This species is known only from semi-desert mountain areas in southern California. I have seen specimens from Riverside, San Bernardino, Los Angeles and Inyo Counties.

Although very closely allied to *M. mendax*, it differs consistently from that species in the characters given below in the key. The two species occupy very similar habitats in the Joshua Tree-Juniper Woodland association, but appear to be allopatric. In California, *M. mendax* is known only from scattered desert mountain ranges in the eastern Mojave Desert, *M. semirufus* from the San



MELLIGER



MENDAX



PHEODIPUS



TENUICARPUS

Figure 2. *Myrmecocystus* spp., pygidia, lateral view: *M. melliger*, from Davis Mts., Tex.; *M. mendax*, cotype from Mt. Washington, Calif.; *M. phaeodipus*, cotype of *M. orbiceps* from Bull Cr., Tex.; *M. tenuicarpus*, from Fresno, Calif.

Jacinto, San Bernardino, San Gabriel and Sierra Nevada ranges flanking desert areas.

The species previously considered to be *M. semirufus* by Wheeler and subsequent authors must now be known as *M. kennedyi* Cole, 1936. In 1950 Creighton listed *M. melliger* var. *testacea* Emery as a synonym of *M. semirufus*. I have examined cotypes of that form and find that it has nothing in common with the true *M. semirufus*, nor is it related to *M. kennedyi*. This species must be transferred to the *mexicanus* group as a valid species and a senior synonym of *M. mojave* Wheeler, 1908, over which it has priority (NEW SYNONYM).

Myrmecocystus placodops Forel

Myrmecocystus melliger var. *placodops* Forel, 1908. Bulletin Société Vaudois des Sciences Naturelles, ser. 5, 44:70. ♀.

Myrmecocystus melliger, Wheeler, 1908. Bull. Amer. Mus. Nat. Hist., 24:348, fig. 2, ♀ ♀; Wheeler, 1912. Psyche, 19:174-175; Creighton, 1950. Bull. Mus. Comp. Zool., 104:442, 444-445. (Misidentification)

Myrmecocystus melliger subsp. *orbiceps* Wheeler, 1908. Bull. Amer. Mus. Nat. Hist., 24:349, fig. 3. ♀ ♀; Wheeler, 1912. Psyche, 19:173; Creighton, 1950. Bull. Mus. Comp. Zool., 104: 442, 445. NEW SYNONYM.

Forel's name was published in March, 1908, and Wheeler's appeared on May 9 of the same year. Accordingly, it is necessary to use the name *M. placodops* for this species. I have examined the unique type, now in the Forel Collection at the Muséum d'Histoire Naturelle, and compared it with cotypes of *M. melliger orbiceps*. There is no doubt that these are conspecific. The type of *M. placodops* is, unhappily, from an unknown locality in Mexico. It is unfortunate that the type locality is thus Mexico, since so little of the range of this species lies in that country. In the United States, *M. placodops* is found from central Texas to southern California. The Mexican distribution of this species appears to be limited to areas immediately adjacent to the International Border.

That portion of the key to *Myrmecocystus* species by Creighton (1950) involving the *M. melliger* complex is inadequate to separate the various forms involved. I have, therefore, prepared the following key to separate the worker and female castes of the four species.

KEY TO MEMBERS OF MYRMECOCYSTUS MELLIGER COMPLEX

WORKERS

1. Worker maxima with head length equal to or exceeding maximum head width, the outer margins of head, in full face view, subparallel or slightly convex; frontal area with dense, distinct punctures; occiput, behind ocelli, with dense, fine punctures; erect mesonotal hairs longer than those of



MYRMEC.



MYRMEC.



MYRMEC.



MYRMEC.

Figure 3. *Myrmecocystus* spp., gynes: left, frontal view of head; right, dorsal view of mesoscutum.

femora, erect hairs elsewhere exceptionally long, slender, flexuous (except in *M. semirufus*, which has especially pronounced cephalic punctures).... 2

Worker maxima with maximum head width exceeding head length, the outer margins of head, in full face view, moderately to strongly convex; frontal area dull, roughened, with scattered weak punctures; occiput, behind ocelli, dull, roughened, with inconspicuous fine punctures; erect hairs everywhere stiff, blunt, those of mesonotum shorter than those of femora..... *placodops* Forel

2. Erect hairs of body very uneven in length, exceptionally long, slender, pointed, those of mesonotum longer than those of femora; frontal punctures somewhat obscured by roughened integument..... 3

Erect hairs of body uniform in length, short, stiff, blunt, those of mesonotum distinctly shorter than those of femora; frontal integument somewhat shining, the punctures very distinctly defined..... *semirufus* Emery

3. Head of all sizes longer than broad; longest pronotal hairs longer than greatest eye length..... *melliger* Forel

Head of largest workers as broad as long; longest pronotal hairs no more than three-fourths as long as greatest eye length..... *mendax* Wheeler

FEMALES

1. Mesoscutal and mesoscutellar discs finely punctate, the punctures dense and evenly spaced, separated by about 1.5-2.0 times a puncture diameter near notaulices, with or without an impunctate median area, with fine, appressed or subappressed white pubescence in addition to long, coarse, erect yellowish hairs..... 2

Mesoscutal disc with sparse, coarse, setigerous punctures, the integument shining, without appressed pale pubescence; mesoscutellum finely, closely punctate, with scattered coarse punctures..... *semirufus* Emery

2. Mesoscutal disc with a median impunctate area of variable extent, though median line may be punctate..... 3

Mesoscutal disc uniformly punctate throughout..... *mendax* Wheeler

3. Impunctate area of mesoscutal disc with a longitudinal median zone of fine, close punctures; frontal lobes dull, with coarse, variably spaced punctures which become finer and denser toward frontal line; vertex, between eyes

and ocelli, roughened, with scattered, obscure punctures of variable size
*placodops* Forel

Mesoscutal disc with entire median area impunctate; frontal lobes somewhat
 shining, with fine, dense, evenly spaced punctures; vertex between eyes and
 ocelli with fine, distinct, close punctures.....*melliger* Forel

Type material of the species discussed above has been made available through the courtesy of the following: C. Besuchet and C. Ferriere, Muséum d'Histoire Naturelle, Geneva; W. L. Brown, Jr., Museum of Comparative Zoology; J. G. Rozen, Jr., American Museum of Natural History; D. R. Smith, United States National Museum. To each of these gentlemen, I offer my most profound thanks for their cooperation. The figures were prepared by Ruth Ann DeNicola under assistance rendered by Grant No. 4494, the Penrose Fund, of the American Philosophical Society.

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